

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE- VII<sup>th</sup> SEMESTER-EXAMINATION – MAY/JUNE- 2012****Subject code: 172101****Date: 24/05/2012****Subject Name: Physical Metallurgy-II****Time: 02:30 pm – 05:00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Draw completely labeled TTT diagram for eutectoid steel. Explain the changes taking place when this steel is cooled at different cooling rates. **07**  
(b) Differentiate between annealing and normalizing. **07**

- Q.2** (a) Describe mechanism of formation of austenite on heating eutectoid steel. **07**  
(b) On iron-iron carbide diagram show clearly temperature ranges for different heat treatment processes. **07**

**OR**

- (b) Explain austenitic grain size determination techniques. **07**

- Q.3** (a) Write a short note on Hull-Mehl model of pearlitic transformation. **07**  
(b) What is critical cooling rate? What is the effect of alloying elements? **07**

**OR**

- Q.3** (a) Discuss briefly martensitic transformation. **07**  
(b) What is hardenability? Discuss Jominy hardenability test. **07**

- Q.4** (a) Explain briefly types of annealing processes. **07**  
(b) List surface hardening methods and explain any one method. **07**

**OR**

- Q.4** (a) With a TTT diagram explain conventional hardening and tempering process. **07**  
(b) Write short note on patenting. **07**

- Q.5** (a) Explain age hardening treatment. **07**  
(b) Discuss the causes and remedies of defects in heat treatment. **07**

**OR**

- Q.5** (a) Explain Austempering. **07**  
(b) Write a short note on heat treatment furnaces. **07**

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